

# 1.2A, 2.2MHz Step-Down Switching Regulator in 2mm×3mm DFN

## DESCRIPTION

Demonstration circuit 1050 is a monolithic step-down DC/DC switching regulator featuring LT3503. The demo board is designed for 3.3V output from a 4.5V to 20V input. The wide input range of the LT3503 allows a variety of input sources. The typical sources are automotive batteries, wall adaptors and industrial supplies. The 2.2MHz switching frequency allows the use of small, low cost inductor and ceramic capacitors, resulting in low, predictable output ripple. The current mode control scheme creates fast transient response and good loop stability. The internal compensation reduces the component count and solution size. The gate drive of the internal switch is boosted to a voltage that is higher than the  $V_{in}$  to ensure saturation of the switch. A charge pump consisting of a diode and capacitor on the demo board performs the boost function. The  $\overline{SHDN}$  pin can be used to set the part in micropower shutdown mode, reducing

the supply current to less than 2uA. The  $\overline{SHDN}$  pin can also be used to program soft start. In this mode, the  $\overline{SHDN}$  pin is driven through an external RC filter to create a voltage ramp on this pin. The soft start function reduces the input current surge during start-up. Cycle by cycle current limit, frequency foldback and thermal shutdown provide the protection against shorted outputs.

The LT3503 datasheet gives a complete description of the part, operation and application information. The datasheet must be read in conjunction with this quick start guide for demo circuit 1050.

**Design files for this circuit board are available. Call the LTC factory.**

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### Performance Summary ( $T_A = 25^\circ\text{C}$ )

PARAMETER FOR STEP-DOWN CONVERTER	CONDITION	VALUE
Minimum input voltage		4.5V
Maximum input voltage		20V
Output voltage $V_{out}$		3.3V +/- 4%
Maximum output current	$V_{in} = 5.5\text{V}$	1A
Maximum output current	$V_{in} = 8.5\text{V}$	1.2A
Typical switching frequency		2.2MHz

## QUICK START PROCEDURE

Demonstration circuit 1050 is easy to set up to evaluate the performance of the LT3503. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

**NOTE .** When measuring the input or output voltage ripple, care must be taken to avoid a long ground lead on the oscilloscope probe. Measure the input or output voltage ripple by touching the probe tip directly across the  $V_{in}$  or  $V_{out}$  and GND terminals. See Figure 2 for proper scope probe technique.

1. Place JP1 in the RUN position:
2. With power off, connect the input power supply to  $V_{in}$  and GND.
3. Turn on power at the input.
4. Check for proper output voltages.

**NOTE .** Make sure that the input voltage does not exceed 20V.

**NOTE .** If there is no output, temporarily disconnect the load to make sure that the load is not set too high.

# LT3503

5. Once the proper output voltages are established, adjust the loads within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.

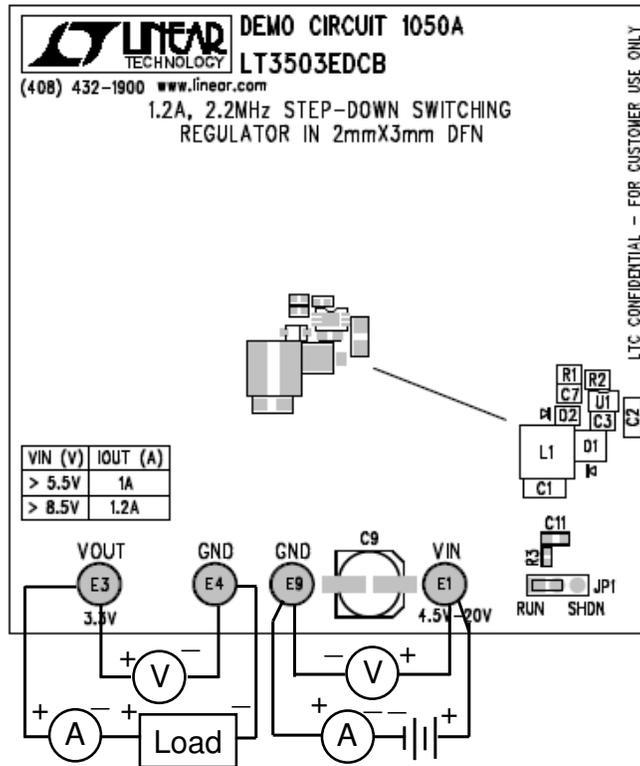


Figure 1. Proper Measurement Equipment Setup

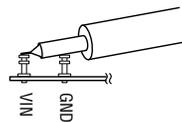
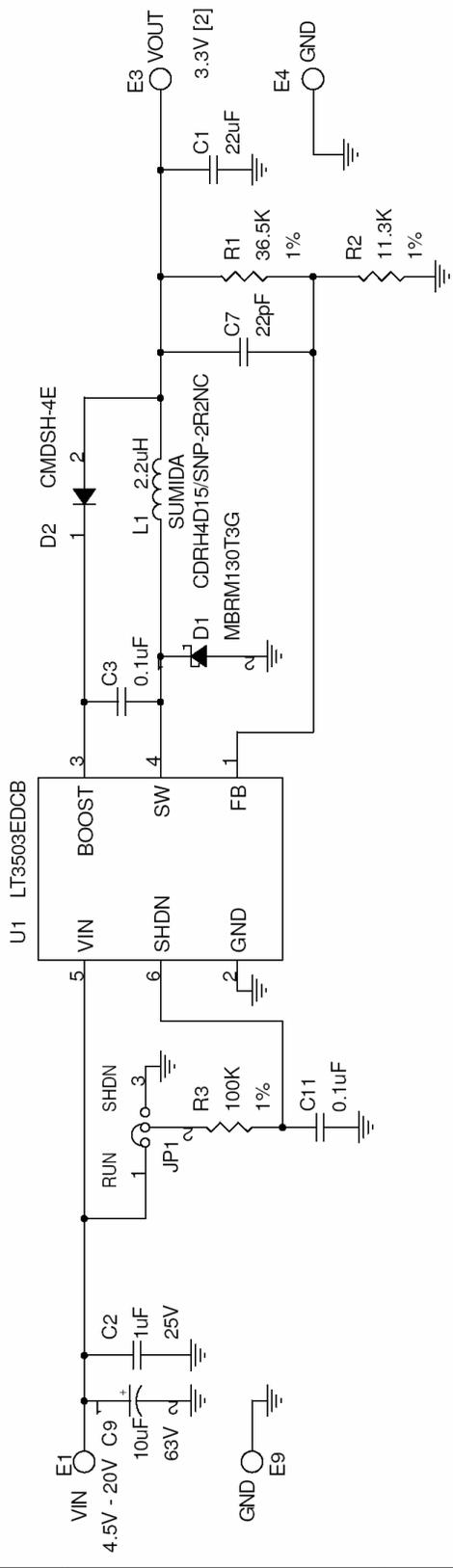


Figure 2. Measuring Input or Output Ripple

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**Customer Notice:** Linear Technology has made a best effort to design a circuit that meets customer-supplied specifications; however, it remains the customer's responsibility to verify proper and reliable operation in the actual application. Component substitution and printed circuit board layout may significantly affect circuit performance or reliability. Contact Linear Applications Engineering for assistance.



NOTES: UNLESS OTHERWISE SPECIFIED,  
 [1] DO NOT STUFF.

[2]	VIN (V)	IOUT (A)
	5.5V	1A
	8.5V	1.2A

CONTRACT NO.		1630 McCarthy Blvd. Milpitas, CA 95025 Phone: (408)432-1900 Fax: (408)434-0507	
APPROVALS	DATE	TITLE	
DRAWN MEI	01/23/06	SCH, LT3503EDCB, 1.2A, 2.2MHz STEP-DOWN SWITCHING	
CHECKED		REGULATOR IN 2mmX3mm DFN	
APPROVED		SIZE	CAGE CODE
ENGINEER		DWGNO	DC1050A
DESIGNER		REV	2
Friday, September 29, 2006		SCALE:	FILENAME: 1050A-2.DSN
		SHEET	1 OF 2

REVISION HISTORY			
ECO	REV	DESCRIPTION	DATE
	1	PROTO	01/23/06
	2	Changes	09/20/06